

PROJECT facts

DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY
FEDERAL ENERGY TECHNOLOGY CENTER

ADVANCED CLEAN/EFFICIENT
POWER systems

PS013.0697

ADVANCED COAL-FIRED LOW EMISSION BOILER SYSTEMS FOR TOMORROW'S POWER PLANTS

PRIMARY PROJECT PARTNERS

Babcock & Wilcox
Alliance, OH

MAIN SITE

Alliance, OH
Barberton, OH

TOTAL ESTIMATED COST

\$47,826,000

COST SHARING

DOE	\$29,312,000
Non-DOE	\$18,514,000

Project Description

Babcock & Wilcox is developing the next generation of highly advanced, coal-fired boiler systems, incorporating new, high-performance control technologies that will result in an ultraclean and efficient coal-based technology for tomorrow's power plants. These new power plants, called Low Emission Boiler Systems (LEBS), are based on industry-proven and accepted pulverized coal-combustion technology.

In recent years, several innovative acid-rain emissions-control technologies have been demonstrated in the Department of Energy's Clean Coal Technology Program and elsewhere. Most of these advanced systems have been designed as retrofits to existing boilers.

In Babcock & Wilcox's new boiler system, these pollution-control advances are integrated into an original design. Because the entire plant is being designed around the new technologies, each subsystem can be optimized without the constraints imposed by retrofitting into an existing boiler. The result will be a coal-fired boiler with unprecedented environmental performance.

Babcock & Wilcox is developing a limestone injection dry scrubbing system (E-LIDS™) to reduce sulfur emissions by 97% while using the least expensive sulfur sorbent, limestone. Beginning with its commercial DRB-XCL® burner as a base for development, the company is producing an advanced low-NO_x burner design (DRB-4Z™) with staging that will ensure emissions levels much lower than those of their existing commercial burner technology.

Program Goal

Coal is by far the Nation's most abundant energy resource, but burning coal to generate energy could produce harmful emissions if not controlled. DOE's strategic plan aims not only to ensure a reliable and affordable energy supply for the U.S., but to minimize environmental impact as well. The highly advanced coal-fired Low Emission Boiler System will achieve significantly lower emissions and higher plant efficiencies than conventional units. This system will also deliver electricity at costs no higher than those of current pulverized-coal-fired plants. The success of the program will place our Nation in a strong position to supply power-generation and environmental-control systems to a fast-growing world market.

ADVANCED COAL-FIRED LOW EMISSION BOILER SYSTEMS FOR TOMORROW'S POWER PLANTS

CONTACT POINTS

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Project Partners

**RAYTHEON ENGINEERS &
CONSTRUCTORS, INC.**
Denver, CO
(balance-of-plant and
architect-engineering
services)

Project Benefits

In the near future, the United States will have to build a new generation of coal-based power plants to replace its aging units. Coal supplies more than 56% of the Nation's electricity, and, because of our abundant reserves, it will remain the dominant source of fuel for power generation well into the next century. A national cap on sulfur and nitrogen oxide emissions, however, will require future coal technologies to be much cleaner than current technologies.

DOE is sponsoring the Low Emission Boiler Systems (LEBS) program to meet these power and environmental needs. Without significantly departing from the traditional design features of pulverized-coal-firing systems, this technology will:

- Reduce sulfur dioxide and nitrogen oxide emissions to a sixth of the level allowed by today's Federal air quality standards (New Source Performance Standards).
- Lower emissions of flyash and other particulates to a third of those allowed by today's standards.
- Significantly improve power plant efficiency—up to 50% from today's level of 35%
- Produce electricity at costs equal to or less than those of a modern-day coal plant.

LEBS is one of several advanced power-generation systems being developed with support from DOE. Of these systems, LEBS offers the nearest-term commercial option for utilities to meet these performance goals for the new installations. In addition, many of the technologies that are being developed in the LEBS program will be available for retrofit or repowering applications at existing facilities.

Babcock & Wilcox, along with ABB-CE and DB Riley, are leading teams that are independently developing Low Emission Boiler Systems that incorporate each team's unique, preferred technologies. In late 1997, one of the teams will be selected to construct and operate the proof-of-concept (POC) test facility to provide the engineering data needed for commercialization by the year 2000.

Cost Profile

(Dollars in Millions)

	Prior Investment	FY95	FY96	FY97	Future Funds**
Department of Energy*	\$6.3	\$2.1	\$4.7	\$3.6	\$12.7
Private Sector Partners	\$0.8	\$0.7	\$1.6	\$2.7	\$12.7

* Appropriated Funding

** If B&W is selected to perform proof-of-concept (POC) testing, the final phase of the LEBS development effort, a total of approximately \$30 million (\$15 million DOE) will be required, part of it from FY97 funds.

Key Milestones

FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00
Concept development	Subsystem testing		Proof-of-concept facility: revised design		Proof-of-concept facility: revised design		Construction and operation of proof-of-concept facility	
Preliminary R&D	Proof-of-concept: facility design		Host site selection for proof-of-concept facility		Commercial generating unit: revised design			
Component testing								
Commercial generating unit: preliminary design								